INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2005/003662

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl[7] F02F1/24, F02M37/00, 55/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int.Cl[7] F02F1/00-11/00, F02M37/00-71/04

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2005
Kokai Jitsuyo Shinan Koho 1971-2005 Toroku Jitsuyo Shinan Koho 1994-2005

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y A	JP 9-242642 A (Robert Bosch GmbH), 16 September, 1997 (16.09.97), Full text; Figs. 1, 2 & GB 2310892 A & DE 19608572 A & FR 2745850 A	1-5,8 6 7
Y	JP 2001-510529 A (Robert Bosch GmbH), 31 July, 2001 (31.07.01), Full text; Figs. 1 to 5 & US 6318339 B1 & WO 99/028617 A1 & DE 19753518 A1	6

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 June, 2005 (14.06.05)	28 June, 2005 (28.06.05)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (January 2004)

ATTACHMENT D

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF TRANSMITTAL
OF COPIES OF TRANSLATION
OF THE INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY
(CHAPTER I OR CHAPTER II
OF THE PATENT COOPERATION TREATY)
(PCT Rules 44*bis*.3(c) and 72.2)

To:

TAKAHASHI, Masahisa
Room 1003
Ambassador Roppongi Buildings
16-13, Roppongi 3-chome
Minato-ku, Tokyo 1060032
JAPON

Date of mailing *(day/month/year)* 28 September 2006 (28.09.2006)	
Applicant's or agent's file reference 05-009PCT	**IMPORTANT NOTIFICATION**
International application No. PCT/JP2005/003662	International filing date *(day/month/year)* 25 February 2005 (25.02.2005)
Applicant MITSUBISHI HEAVY INDUSTRIES, LTD. et al	

1. **Transmittal of the translation to the applicant.**

☑ The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter I).

☐ The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter II).

2. **Transmittal of the copy of the translation to the designated or elected Offices.**

The International Bureau notifies the applicant that copies of that translation have been transmitted to the following designated or elected Offices requiring such translation:

None

The following designated or elected Offices, having waived the requirement for such a transmittal at this time, will receive copies of that translation from the International Bureau only upon their request:

AE, AG, AL, AM, AP, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EA, EC, EE, EG, EP, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OA, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

3. **Reminder regarding translation into (one of) the official language(s) of the elected Office(s).**

The applicant is reminded that, where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability (Chapter II).

It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned within the applicable time limit (Rule 74.1). See Volume II of the PCT Applicant's Guide for further details.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Masashi Honda
Facsimile No. +41 22 338 82 70	Facsimile No. +41 22 338 82 70

ATTACHMENT F

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference 05-009PCT	**FOR FURTHER ACTION**	See item 4 below
International application No. PCT/JP2005/003662	International filing date *(day/month/year)* 25 February 2005 (25.02.2005)	Priority date *(day/month/year)* 27 February 2004 (27.02.2004)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant MITSUBISHI HEAVY INDUSTRIES, LTD.		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44*bis*.3(c) and 93*bis*.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44*bis* .2).

	Date of issuance of this report 19 September 2006 (19.09.2006)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Authorized officer Masashi Honda e-mail: pt08@wipo.int

Form PCT/IB/373 (January 2004)

PATENT COOPERATION TREATY

TRANSLATION

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

	Date of mailing *(day/month/year)*
Applicant's or agent's file reference 05-009PCT	FOR FURTHER ACTION See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/JP2005/003662	25.02.2005	27.02.2004

International Patent Classification (IPC) or both national classification and IPC

Applicant
MITSUBISHI HEAVY INDUSTRIES, LTD.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/JP	Authorized officer
Facsimile No.	Telephone No.

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/JP2005/003662

Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

☐ a sequence listing

☐ table(s) related to the sequence listing

b. format of material

☐ in written format

☐ in computer readable form

c. time of filing/furnishing

☐ contained in the international application as filed.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/JP2005/003662

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	2-8	YES
	Claims	1	NO
Inventive step (IS)	Claims	7	YES
	Claims	1-6, 8	NO
Industrial applicability (IA)	Claims	1-8	YES
	Claims		NO

2. Citations and explanations:

Document 1: JP, 9-242642, A (Robert Bosh GmbH), 16 September, 1997 (16.09.97), full text and Figs. 1 and 2 & GB, 2310892, A & DE, 19608572, A & FR, 2745850, A

Document 2: JP, 2001-510529, A (Robert Bosh GmbH), 31 July, 2001 (31.07.01), full text and Figs. 1-5 & US, 6318339, B1 & WO, 99-028617, A1 & DE, 19753518, A1

Claim 1
Document 1 discloses an internal combustion engine having a fuel joint block comprising an internal combustion engine constructed such that a high-pressure fuel pressure-fed from a fuel injection pump is supplied to a fuel injection valve through a fuel supply path provided inside a cylinder head, wherein
an integrated type fuel joint block in which a fuel supply path through which a high-pressure fuel flows and a leak fuel path through which a leak fuel flows are arranged is detachably installed on a cylinder head;
a high-pressure fuel inlet of the fuel joint block is connected to a fuel path from a fuel injection pump, and a high-pressure fuel outlet of the fuel joint block is directly connected to a fuel path on the cylinder head side;
a fuel connector part, of which one end is connected to the fuel injection valve and a fuel path on the cylinder head side is formed inside, is inserted into a hole formed in a boss part of the cylinder head;
the fuel joint block is fixed to the cylinder head by fluid-tightly pressure-connecting ends of the fuel connector part;
a leak fuel path through which a leak fuel flows is formed between the fuel connector part and the cylinder head, and the leak fuel path is connected to a leak fuel path formed inside the fuel joint block;
and an O-ring seal part interposing an O-ring for sealing the leak fuel path from the outside is provided in the joint of the fuel joint block and the cylinder head.

Claims 2-5
In the internal combustion engine having a fuel joint block described in the document 1, making the fuel joint block and the fuel connector part separate bodies is merely a design variation a person skilled in the art could have done accordingly.
Also, interposing a sheet-shaped gasket in the joint of the fuel joint block and the cylinder head is merely a design variation a person skilled in the art could have done accordingly.
Accordingly, inventions related to claims 2-5 could have easily been conceived by a person skilled in the art based on the internal combustion engine having a fuel joint block described in the document 1, and do not appear to be inventive.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/JP2005/003662

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Claim 6

Document 2 discloses a composition in which the joint part of a fuel connector and a fuel injection valve is screw-connected (see Fig. 1).

And, since the invention related to claim 6 could have easily been conceived by adopting above-mentioned composition of the document 2 to the internal combustion engine having a fuel joint block described in the document 1, and does not appear to be inventive.

Claim 8

Document 1 discloses the assembling method of a fuel system in an internal combustion engine comprising the assembling method of a fuel system in an internal combustion engine constructed such that a high-pressure fuel pressure-fed from a fuel injection pump is supplied to a fuel injection valve through a fuel supply path provided inside a cylinder head, wherein

the fuel injection valve is incorporated into the cylinder head;

a rod-shaped fuel connector part, in which a fuel supply path is formed inside, is inserted into a hole formed in a boss part of the cylinder head; and

an integrated type fuel joint block in which a fuel supply path through which a high-pressure fuel flows and a leak fuel path through which a leak fuel flows are arranged is bolt-fixed to the cylinder head by fluid-tightly pressure-connecting, with respect to the fuel path, one end of the fuel connector part to the fuel injection valve (see Fig. 1).

And, composing and assembling the fuel connector part as a separate body with respect to the fuel joint block is merely a design variation a person skilled in the art could have done accordingly.

Accordingly, the invention related to claim 8 could have easily been conceived by a person skilled in the art based on the assembling method of the fuel system in the internal combustion engine described in the document 1.

Claim 7

The invention related to claim 7 is not described in any of the documents 1 and 2, nor is obvious to a person skilled in the art.